



Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Fellows Lake

Waterbody Segments at a Glance:

County: Greene
Nearby Cities: Springfield
Area of impairment: 820 lake acres
Pollutant: Algae
Source: Agricultural and Urban
Nonpoint Source



State map showing location of watershed

The department is requesting that this lake be removed from the 303(d) list

TMDL Priority Ranking: Medium

Description of the Problem:

Beneficial uses of Fellows Lake (as designated in Missouri's Water Quality Standards)

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption
- Whole Body Contact Recreation (Swimming)
- Boating and Canoeing
- Drinking Water Supply

Use that is impaired on the 1998 303(d) list

- Drinking Water Supply

Standards that apply

- An algae impairment would be based on exceedence of the general criteria contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031(3)(A) and (C). Here it states:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

Background Information and Water Quality Data

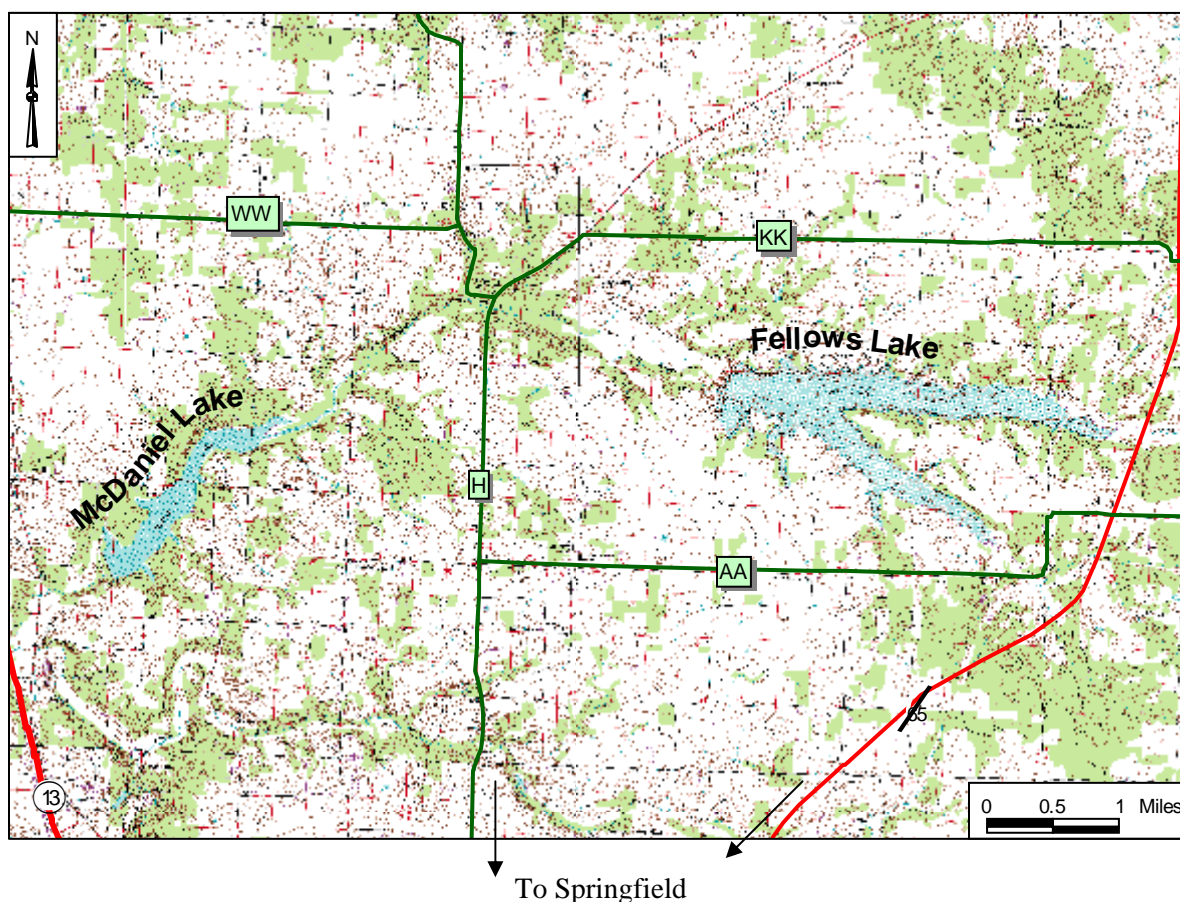
It should be noted that watering of livestock and swimming are not allowed in Fellows Lake, even though those are designated as uses in the WQS. This lake serves as a drinking water supply for the city of Springfield along with McDaniel Lake, Stockton Lake, the James River and Fulbright Spring.

In the past two decades, there has been only one complaint about the drinking water in Fellows Lake having taste and odor problems. A taste and odor problem can occur at the same time that specific types of blue-green algae, also known as cyanobacteria, reach peak levels in a waterbody. Increased production of cyanobacteria is related primarily to phosphorus (P) and nitrogen (N) in the water, abundant sunlight and warm water temperatures.

The U.S. Environmental Protection Agency approved a TMDL for McDaniel Lake dealing with this problem (algae) in February 2004. Fellows Lake is part of the McDaniel Lake watershed, so some of the measures being taken in the watershed to improve McDaniel Lake would also benefit Fellows Lake. However, since there has only been one taste and odor event in Fellows Lake and there is no additional data saying that it is impaired for nutrients, the department believes a TMDL is not required for this lake. For this reason, the department is requesting that EPA remove this waterbody from the 303(d) list for nutrients.

A location map of Fellows and McDaniel lakes may be found below, followed by a table summarizing data from Fellows Lake and graphs showing the relationship between phosphorus and chlorophyll-a in the lake.

Fellows and McDaniel Lakes in Greene County, north of Springfield, Missouri



Nutrients, Chlorophyll-a, and Secchi Depth in Fellows Lake, 1989-2000

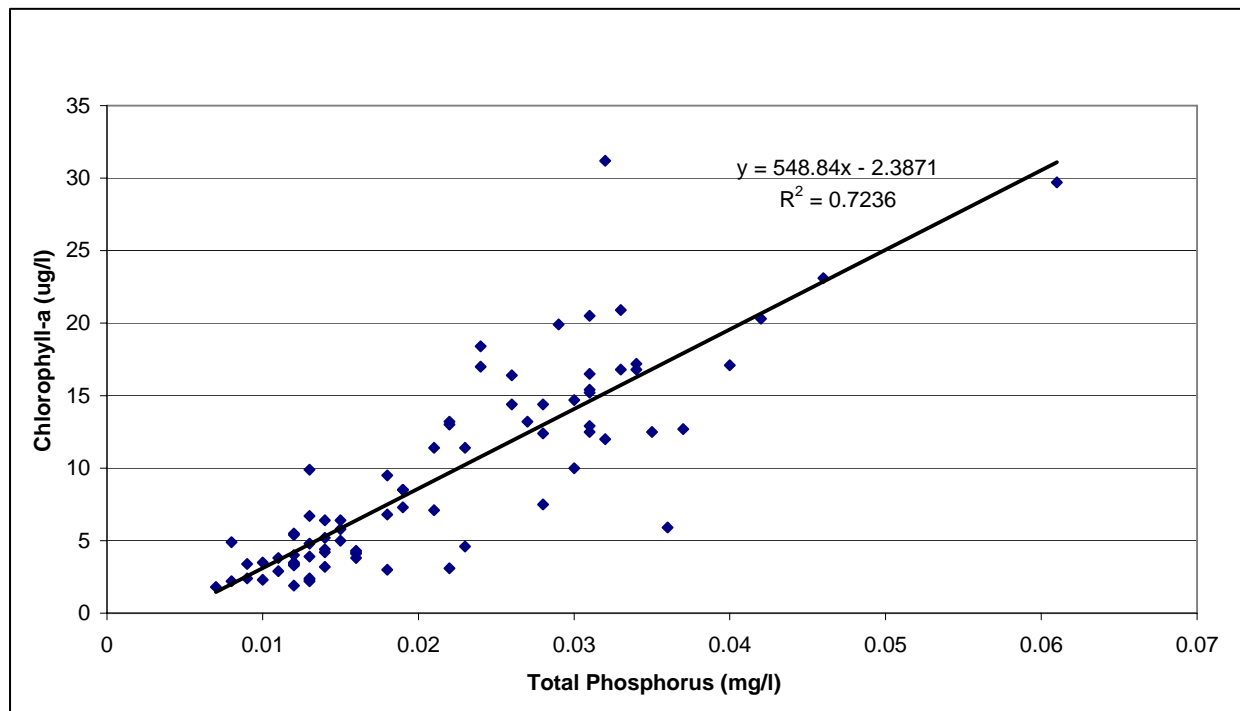
	Average	Maximum	Minimum	Standard Deviation
Total Nitrogen (mg/l)	0.374	0.85	0.23	0.101
Total Phosphorus (mg/l)	0.017	0.049	0	0.006
Chlorophyll-a (µg/l)	5.44	16	1	3.18
Secchi depth (m)	2.91	7.1	1.3	0.896

Sources: Springfield City Utilities and University of Missouri, Columbia

Secchi depth measures the clarity of a lake. The higher the number (of meters), the deeper one can see down into the lake. Increased suspended algae cloud the water (and make it green), thus decreasing Secchi depth.

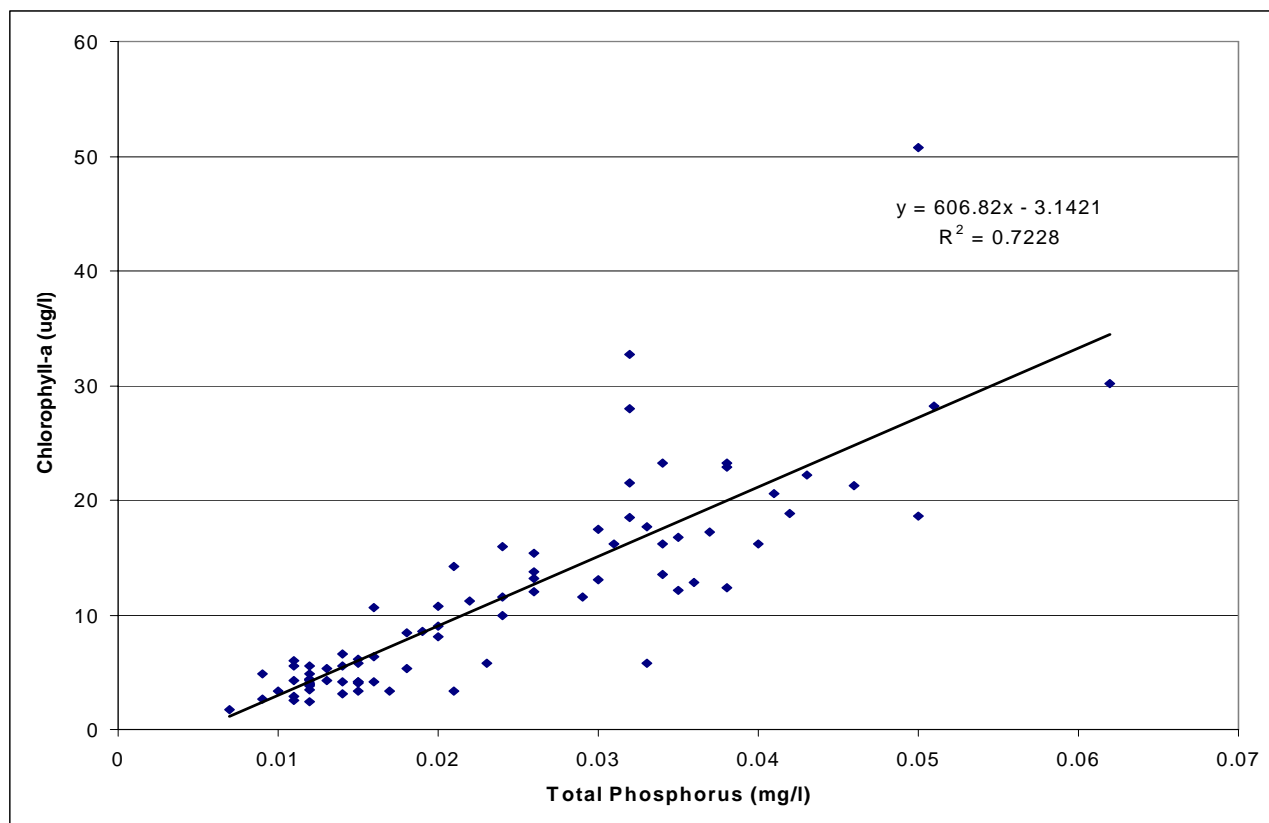
Chlorophyll-a is found in all algae (gives them color) and is used to determine the amount of suspended algae in a waterbody. In general, algae (and thus chlorophyll-a) increase as the concentration of phosphorus increases.

Graph of surface Chlorophyll-a concentrations vs. total phosphorus concentrations in Fellows Lake, 1989-1999



Source: University of Missouri, Columbia

**Graph of subsurface Chlorophyll-a concentrations vs. total phosphorus concentrations
in Fellows Lake, 1989-1999**



Source: University of Missouri, Columbia

For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

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